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Testing of QED: Natural broadening of spectral lines

Al'miev I., Gainutdinov R.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The difficulties associated with surface divergences, of a consistent QED theory in describing of the natural broadening (NB) of atomic systems are studied. This problem seems to be clearly and sensetively (in experimental meaning) appeared in the case of heavy muhicharged ions. To overcome this difficulty we have used a quantity of elementary interaction length, an analogy of the length of coherence. We have obtained that the NB contains a linear 1-divergence besides of a logarifmic one arrising in standard QED calculations. A Z-dependence has allowed us to suggest earring out the experimental testing of QED in the highly ionised atoms with the aid of more accurate technologies.

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Keywords

Atomic spectroscopy, Quantum electrodynamics, Quantum field theory